

A10  
format is split into several channels by a T1 interface 277. Each such channel carries a sequence of 8 bit PCM words at a bit rate of 64 kb/s of a respective telephone channel. In the next step, each PCM stream 279 A, B,... is modulated by VCs DMT modulator 259 that distributes each 64 kb/sec PCM stream between two VCs of DMT signal. In the next step, a VCs QAM modulator and gain-scaler 261 transforms each 8-bit PCM word into one 8-bit QAM symbol and provides a fixed 8-bit loading on each one of the VCs. A synchronization block 255 synchronizes the T1 system clock with the frames of the DMT line signal.

---

Page 15, lines 14-22, delete current paragraph and insert therefor:

---

A11  
Incorporation of several voice channels at a subscriber premises: Data is processed and transmitted in an ATU-R in the same way as described in the first example. Referring now to Fig. 13, it will be seen that voice channel 251A is connected to a voice interface port 253A which is one of several identical ports, where the necessary amplifying and filtering is performed. A PCM encoder 257A is connected to the respective voice interface ports 253A. Each PCM of the encoders has a sampling rate of 8 kHz and transforms an analog voice signal into a 64-kbit/sec sequence of 8-bit PCM words. The PCM coders use standard A-Law or  $\mu$ -Law coding, which is the same one used in PCM telephone systems T1 or E1.

---

Page 15, lines 29-30 and Page 16, lines 1-2, delete current paragraph and insert therefor:

---

A12  
While there has been described and illustrated methods for simultaneously conveying both data and voice signals over a twisted pair telephone line and various systems for carrying out these methods, it must be understood that many changes may be made thereon without departing from the spirit of the claims.

---

IN THE CLAIMS:

Please cancel claims 1-14 without prejudice to or disclaimer of the subject matter contained therein.

Please add new claims 15-27 as follows:

-- ~~15.~~ A method for transmitting voice and data signals simultaneously over a telephone subscriber wire pair, the method comprises:

converting at least one voice signal into a corresponding sequence of n-bit digital words in synchronization with a discrete multi-tone (DMT) line signal;

assigning for voice transmission a portion of a plurality of carriers, each carrier in said portion being characterized by the ability to transmit a number of bits equal to or larger than n per QAM symbol;

assigning other carriers of the DMT line signal for data transmission;

converting said sequence of n-bit digital words into at least one sequence of n-bit QAM symbols where each QAM symbol has a real component constituted of odd bits of said n-bit digital words and an imaginary component constituted of even bits of said n-bit digital words; and

sending said at least one sequence of QAM symbols in synchronization with said sequence of n-bit digital words on respective carriers assigned for voice transmission. --

-- 16. A method according to claim 15 and comprising reassigning several carriers of said assigned portion of carriers for data conveyance when the respective voice channels are identified as silent. --

-- 17. A method according to claim 15 and wherein said n-bit digital words and said n-bit QAM symbols are 8-bit integers respectively. --

-- 18. A method according to claim 15 and comprising converting said voice signal to a respective sequence of n-bit digital words by PCM encoding. --

-- 19. A method according to claim 15 and comprising associating said at least one voice signal with at least one respective telephone channel in analog or in digital form. --

-- 20. A method according to claim 15 and comprising reassigning several carriers of said assigned portion of carriers for data carrying when the respective telephone channels are identified as silent. --

-- ~~21~~. A transmitter for a communication system which conveys voice signals and digital data over a telephone subscriber line, the transmitter comprising:

at least one converter connectable to a corresponding external voice signal source for converting said voice signal into at least one sequence of n-bit digital words;

an assigner connected to each of said converters configured for assigning a portion of carriers of a DMT signal for voice transmission;

A13 a constellation encoder configured for receiving said at least one sequence of n-bit digital words and being configured for modulating said portion of said carriers with at least one sequence of n-bit QAM symbols that correspond to said at least one sequence of n-bit digital words, where each QAM symbol has a real component constituted of odd bits of said n-bit digital words and an imaginary component constituted of even bits of said n-bit digital words;

a synchronizer connected at least to said at least one converter and configured for effecting synchronization between frames of said DMT signal and said sequence of said n-bit digital words; and

a loader configured for conveying said at least one sequence of QAM symbols in synchronization with said sequence of n-bit digital words on respective carriers assigned for voice transmission. --

-- 22. A transmitter according to claim 21 wherein said n-bit digital words are n-bit PCM words. --

-- 23. A transmitter according to claim 21 and comprising a processor configured for analyzing said voice signal and a carrier allocator connected to said processor and configured

to receive instructions from said processor to reassign carriers formerly assigned to voice transmission to data transmission when said processor identifies the corresponding voice channel as being silent. --

-- 24. A transmitter according to claim 21 wherein said subscriber line is a twisted wire pair.

--

-- 25. A transmitter according to claim 22 wherein a plurality of voice interface ports are connected to a corresponding number of PCM encoders, and wherein a PCM concentrator is connected to said PCM encoders and to said assigner. --

A13 -- 26. A transmitter according to claim 21 and comprising a processor configured for analyzing telephone control signals and a carrier allocator connected to said processor and configured to receive instructions from said processor to reassign carriers formerly assigned to voice transmission to data transmission when said processor identifies the corresponding telephone channel as being silent. --

-- 27. A transmitter according to claim 22 and comprising a PCM voice interface port that is connected to external PCM telephone channel equipment of a telephone station, to said assigner and to said synchronizer for synchronizing said DMT frames with said at least one sequence of n-bit digital words of said external PCM telephone channel equipment. --

---

IN THE DRAWINGS:

Please amend Figure 10A as set forth in the attached Request for Approval of Drawing Corrections.